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ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

The Influence of Supplemental Feed on Food Habits of Tamed Deer¹

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In a pinyon-juniper habitat, tamed mule deer with access to unlimited amounts of concentrate feed selected the same forage species in a similar proportion of their diet as deer that received no supplemental feed.

Keywords: Mule deer, food habits, *Odocoileus hemionus*.

The advantages and problems of observing tamed deer (*Odocoileus hemionus*) to acquire data on food habits are thoroughly discussed by Wallmo and Neff (1970). They surmise that tamed deer select the same forage species as their wild counterparts, a judgment based on experience observing both tamed and wild deer grazing, and on other empirical evidence provided by Buechner (1950), McMahon (1964), Watts (1964), and Healy (1967):

All of the available information on this subject supports the assumption that tamed and wild deer eat similar forage species, but the degree of similarity of the diets has never been quantified due to the difficulty of close observation of wild deer. Even if forage selection is an inherited characteristic, as Longhurst and others (1968) suggest, differences in the nutritional status of tamed and wild deer may still influence forage selections. Wild deer may be

more selective than tamed deer because they must subsist entirely on native vegetation. In most food habits research using tamed deer, the animals have had access to supplemental feed before and after grazing trials. The purpose of this study, therefore, was to determine if the forage choices of tamed deer with access to unlimited concentrate feed between observations were different from those of tamed deer which subsisted entirely on native vegetation.

Study Area and Methods

All grazing observations were conducted in a 2-ha enclosure 5 km north of the Little Hills Game Experiment Station, 25 air km west of Meeker, Colorado. Vegetation in the enclosure was representative of one aspect of the pinyon-juniper-mountain browse community. The overstory consisted entirely of *Pinus edulis* and *Juniperus osteosperma*. Shrub species included *Amelanchier utahensis*, *Purshia tridentata*, *Symphoricarpos oreophilus*, *Artemisia tridentata*, and *Cercocarpus montanus*. The most prominent understory species were *Mertensia lanceolata*, *Sphaeralcea coccinea*, and *Lupinus caudatus*. No large herbivores had occupied the enclosure for the previous 7 years.

Six tamed mule deer fawns (approximately 5 months of age) were used in the study. These deer

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were hand-reared and trained at Fort Collins, Colorado, according to the procedures reported by Reichert (1972), and transported to Little Hills on September 21, 1975. The deer were randomly assigned to one of two treatments. Deer in the pasture treatment were placed in the enclosure on September 27, 3 days before grazing observation began, and remained in the pasture for the duration of the study without any supplemental feed. The three deer in the pen treatment were kept in a 30- by 30-m pen at the Little Hills headquarters, where they had access to unlimited concentrate feed and alfalfa. They were transported to the pasture for each grazing trial, and removed to the pen immediately after the trial.

Three observers ran simultaneous grazing trials for 10 consecutive days, beginning on September 30, 1975. A grazing trial is defined as one man following one deer for 1 to 2 hours and recording the number of bites by species eaten by that deer. Three trials were conducted in the morning and three in the afternoon for a total of 60 trials, or 10 per deer. Each deer was observed once daily, with the total observations equally divided between morning and afternoon periods. At the conclusion of all grazing trials, both the total number and the percentage of total bites for each plant species were tabulated by individual deer and for all deer in each treatment.

Results and Discussion

During all grazing trials, 46,103 bites were recorded; 48 species were eaten. The three deer in the pasture treatment took 27,538 bites of 46 different species, while pen-treatment deer consumed 18,565 bites of 39 species. Nine species were eaten by pasture-treatment deer that were not eaten by deer in the pen treatment. Pen-treatment deer grazed only two species which pasture-treatment deer did not eat. None of the species that were in the diet of only one treatment group comprised over 0.4 percent of the total bites, and most were incidental species (less than 15 bites taken). The average number of bites per grazing trial for deer in the pasture treatment was 918, and ranged from 257 to 1,448. Pen-treatment deer averaged 619 bites per trial, with a range of 200 to 1,060 bites. This difference was significant ($P < 0.05$). All deer in both treatments consumed significantly more bites ($P < 0.05$) during afternoon trials. Deer in the pasture treatment took 44.0 percent (range of 40.5 to 47.9) of observed total daily bites during morning trials and pen-treatment deer took 43.4 percent (range 41.6 to 43.8) of their bites during this time.

All species eaten and the percentage each comprised of the total bites taken by all deer and by deer in each treatment are shown below. Only nine species comprised 2.0 percent or more of the total

bites by all deer and, together, they comprised 93 percent of all bites taken—90 percent for the pasture deer and 96 percent for the pen deer.

Species	All deer	Pasture deer	Pen deer
	(Percentage of total bites)		
<i>Purshia tridentata</i>	39.1	44.3	31.5
<i>Amelanchier utahensis</i>	17.2	10.6	27.0
<i>Mertensia lanceolata</i>	15.7	12.7	20.1
<i>Symphoricarpos oreophilus</i>	7.5	7.5	7.1
<i>Cercocarpus montanus</i>	4.1	4.1	4.2
<i>Lupinus caudatus</i>	2.3	3.5	.4
<i>Cryptantha sericea</i>	2.3	2.9	1.3
<i>Sphaeralcea coccinea</i>	2.2	2.7	1.4
<i>Eriogonum umbellatum</i>	2.1	1.6	2.9
<i>Poa pratensis</i>	1.2	2.0	¹ T
<i>Penstemon caespitosus</i>	1.1	.8	1.6
<i>Physaria australis</i>	1.1	1.6	.4
<i>Aster leucanthemifolius</i>	.5	.7	.3
<i>Elymus cinereus</i>	.5	.8	T
<i>Oryzopsis hymenoides</i>	.3	.4	.2
<i>Artemisia tridentata</i>	.3	.4	0
<i>Penstemon fremontii</i>	.2	.1	.3
<i>Poa fendleriana</i>	.2	.3	.1
<i>Astragalus convallarius</i>	.2	.3	T
<i>Chrysothamnus nauseosus</i>	.2	.2	.1
<i>Descurainia richardsonii</i>	.2	.3	T
<i>Sitanion hystrix</i>	.2	.2	T
<i>Arabis holboellii</i>	.1	.2	T
<i>Senecio multilobatus</i>	.1	.2	0
<i>Bromus inermis</i>	.1	.3	T
<i>Senecio integerrimus</i>	T	.1	T
<i>Lithospermum ruderales</i>	T	T	T
<i>Carex species</i>	T	T	T
<i>Chenopodium fremontii</i>	T	T	T
<i>Pinus edulis</i>	T	T	T
<i>Balsamorhiza sagittata</i>	T	T	T
<i>Koeleria cristata</i>	T	T	0
<i>Chrysothamnus viscidiflorus</i>	T	T	T
<i>Senecio mutabilis</i>	T	T	T
<i>Streptanthus cordatus</i>	T	T	T
<i>Tragopogon dubius</i>	T	T	T
<i>Erigeron eatoni</i>	T	T	T
<i>Antennaria microphylla</i>	T	T	T
<i>Polygonum sawatchense</i>	T	T	0
<i>Agropyron inerme</i>	T	T	T
<i>Collinsia parviflora</i>	T	T	T
<i>Artemisia ludoviciana</i>	T	T	0
<i>Erysimum asperum</i>	T	0	T
<i>Stipa comata</i>	T	0	T
<i>Phlox longifolia</i>	T	T	0
Mushroom	T	T	T
Unidentifiable forb	T	T	T
Unidentifiable grass	T	T	T

¹T = trace = < 0.1

To determine if selection of these nine major forage species varied significantly between treatments, a profile analysis of variance for two groups over species was done. Two analyses were run, one on the percentage of total bites (with arcsine transformation), and the other on the number of bites of the nine major species eaten by each deer each day. The analyses produced nearly identical results, and did not change the significance level of any test. These analyses allowed a test of the diet variability between deer within the same treatment group, and a strong test of the treatment \times species interaction, which was the major item of interest. The treatment effect was not significant ($P < 0.05$), indicating the three deer within each treatment selected the major forage species in similar proportions of their diet.

The treatment \times species interaction was significant ($P < 0.05$), however. The data were graphed (fig. 1) to determine where the interaction occurred. The major difference between the two groups of deer was in the

proportions of the three most prominent species in their diets. The deer in the pasture (no supplemental feed) ate more *Purshia tridentata* and less *Amelanchier utahensis* and *Mertensia lanceolata* than deer in the pen treatment. The proportions of the other major species were similar between the two treatments with the exception of *Lupinus caudatus*, of which deer in the pen treatment ate very little.

The composition of shrubs, forbs, and grasses in the diets of the deer in each treatment was similar. Shrubs comprised 67.1, forbs 28.6, and grasses 4.3 percent of the diet in the pasture treatment and 69.9, 29.5, and 0.6 in the pen treatment.

The intent of most food habits studies is to identify all forage species, and indicate those which are major components of the diet. This study demonstrated that tamed deer receiving supplemental feed select the same forage species in the bulk of their diet as deer subsisting on native forage.

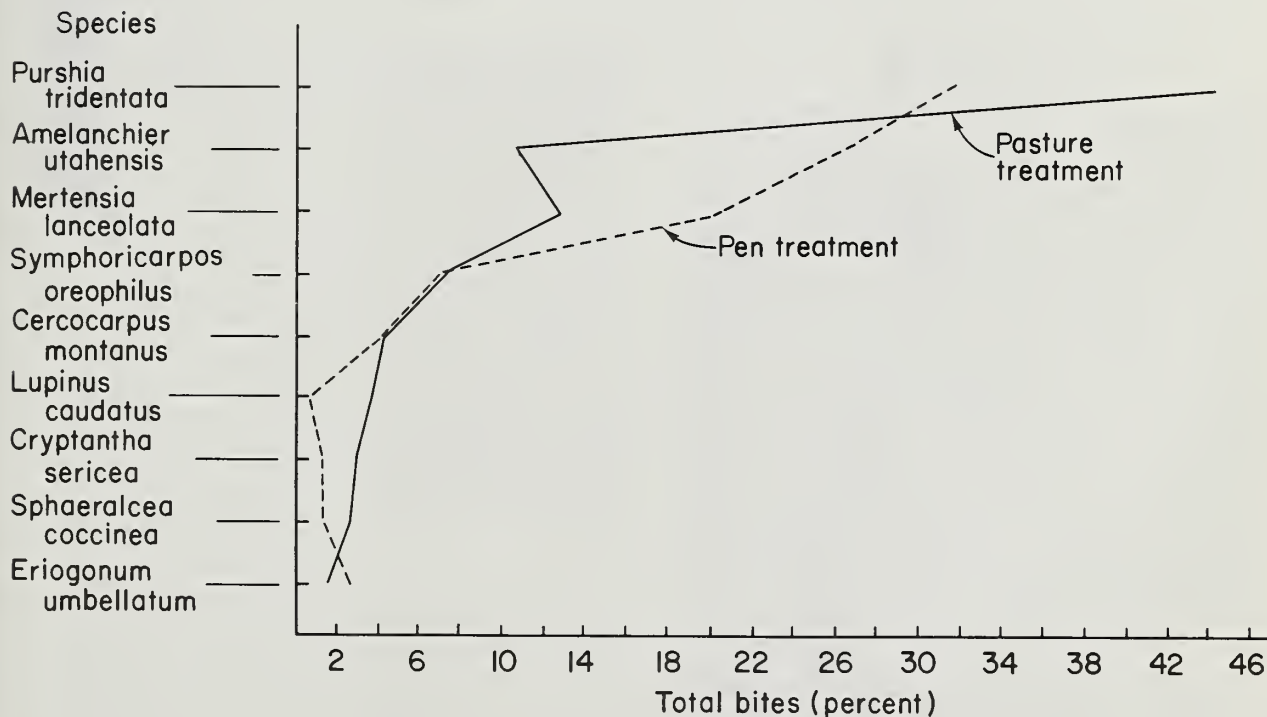


Figure 1.—Percentage of major diet components by pen and pasture treatments.

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